

January 22, 2007

J.N. 5095-01

Mr. Randall McManus
2295 Needham Road, Suite 49
El Cajon, CA 92020

PROJECT: *Sundale Subdivision*
RE: *Environmental Noise Assessment*

Dear Mr. McManus:

This report contains our assessment of the noise environment at the proposed Sundale Subdivision project located in the County of San Diego. In summary, this noise assessment has been conducted in response to the County's Scoping Letter dated December 30, 2005 which requires a noise study evaluating traffic noise along Hillsdale Road. The project would develop the site with 15 lots. The future noise level at the proposed building pad sites would range up to approximately 70 dB CNEL at Lots 9 and 10 adjacent to Hillsdale Road. This noise level would exceed the County's 60 dB CNEL exterior noise criterion. A minimum six to seven-foot high noise barrier along Lots 9 and 10 would be required to mitigate the noise impact. To comply with the County's interior noise standard, an interior noise analysis will be required for Lots 9 and 10 prior to issuance of building permits. Also, Lots, 7, 8, 11 and 12 will require an interior noise study if two story homes are constructed on these lots and located within the 60 dB CNEL noise contour. The homes on these lots could require air conditioning or mechanical ventilation system and sound-rated windows to mitigate the interior noise impact.

1.0 BACKGROUND

1.1 Project Setting

The Sundale Subdivision project site is located on the north side of Hillsdale Road approximately 1,000 feet east of Jamacha Road (*Figures 1 and 2*). The project would develop the site with 15 single family lots. The primary existing noise source at the site is vehicular traffic along Hillsdale Road. Hillsdale Road is designated as a two-lane light collector (SC 2030) road in the current County Circulation Element. The road is proposed as a Community Collector (2.1E) in the proposed 2020 General Plan (County of San Diego, August 2006). The existing traffic volume is approximately 7,000 average daily traffic (ADT) along Hillsdale Road

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(SANDAG 2005). This analysis is based on the preliminary grading plan (Welsh Engineering, June 27, 2005).

1.2 County Noise Criteria

The County of San Diego typically describes community noise levels in terms of the Community Noise Equivalent Level (CNEL). CNEL is the average A-weighted sound level during a 24-hour day. It is obtained after adding five decibels (dB) to sound levels in the evening hours (7 p.m. to 10 p.m.) and adding ten dB to the sound levels at night (10 p.m. to 7 a.m.). The five and ten dB penalties are applied to account for increased noise sensitivity during the evening and nighttime hours. The A-weighted scale measures noise levels corresponding to the human hearing frequency response. All sound levels discussed in this report are A-weighted. The acoustical terminology used in this report is defined in *Attachment 1*.

The County has established exterior noise guidelines in the noise element of the County's adopted General Plan (County of San Diego 2006). These guidelines identify compatible exterior noise levels for various land use types. The maximum acceptable exterior noise level for new single family development is 60 dB CNEL. This criterion is applied at the outdoor noise sensitive area. In addition, the County requires that interior noise levels not exceed a CNEL of 45 dB.

Applicable to this project, Part 3 of Policy 4b of the County's Noise Element state that:

If the acoustical study shows that noise levels at any noise sensitive area will exceed CNEL equal to 60 decibels, the development should not be approved unless the following findings are made:

- A. Modifications to the development have been or will be made which reduce the exterior noise level below CNEL equal to 60 decibels; or
- B. If with current noise abatement technology it is infeasible to reduce exterior CNEL to 60 decibels, then modifications to the development have been or will be made which reduce interior noise below CNEL equal to 45 decibels. Particular attention shall be given to noise sensitive interior spaces such as bedrooms. And,
- C. If finding "B" above is made, a further finding is made that there are specifically identified overriding social or economic considerations which warrant approval of the development without modification as described in "A" above.

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For single family detached dwellings the exterior noise is measured at an outdoor living area which adjoins and is on the same lot as the dwelling, and which contains at least the following minimum area (County of San Diego 2006):

1. Net lot area up to 4,000 square feet: 400 square feet
2. Net lot area 4,000 square feet to 10 acre: 10% of net lot area
3. Net lot area over 10 acre: 1 acre

2.0 EXISTING CONDITIONS

2.1 Ambient Noise Monitoring

A noise measurement was conducted at the site to determine the existing traffic noise level along Hillsdale Road. The measurements were made with a calibrated Larson-Davis Laboratories Model 700 (S.N. 2132) integrating sound level meter equipped with a Type 2551 ½-inch pre-polarized condenser microphone with pre-amplifier. When equipped with this microphone, the sound level meter meets the current American National Standards Institute standard for a Type 1 precision sound level meter. The sound level meter was positioned at a height of approximately five-feet above the ground.

The noise measurement was conducted on April 6, 2006. The noise measurement location is depicted as Site 1 on *Figure 3*. This site was selected to provide an unobstructed view to Hillsdale Road. The measured average noise level was 63 dB at Site 1. The measured average noise level and the concurrent traffic volume are depicted in *Table 1*.

TABLE 1
Measured Noise Level and Traffic Volumes

Site	Description	Date Time	L _{eq} ¹	Cars	MT ²	HT ³
1	Approximately 30 ft. to centerline of Hillsdale Road	4/6/06 9:50 to 10:20 a.m.	63 dB	67	2	1

Notes: ¹ Equivalent Continuous Sound Level (Time-Average Sound Level)

² Medium Trucks

³ Heavy Trucks

Temperature 64 degrees, 40 percent relative humidity. Light and variable wind.

2.2 Noise Modeling

The existing CNEL was calculated for Site 1 based on the current traffic volume along Hillsdale Road using Caltrans' SOUND32 noise model (Caltrans 1983) with California noise emission factors (Caltrans 1987). The same traffic volume and vehicle composition ratio counted during the noise measurement was used to calibrate the model and verify the input used in the noise model. The modeled existing traffic speed was 45 mph along Hillsdale Road. The modeled value was within one dB of the measured noise level at Site 1. This generally confirms the assumptions used in the noise model.

To determine the CNEL the existing daily truck mix along Hillsdale Road was two percent medium trucks one percent heavy trucks. The modeled existing CNEL is 69 dB at Site 1. The noise modeling data is included in *Attachment 2*.

3.0 FUTURE CONDITIONS

Hillsdale Road would continue to be the primary traffic noise source in the future. The future year 2030 traffic volume forecast for Hillsdale Road is projected to reach 12,000 ADT (SANDAG 2006).

3.1 Exterior Traffic Noise Impact

The noise modeling results indicated that the future noise level at Lots 9 and 10 would range up to approximately 70 dB CNEL. This noise level would exceed the County's noise criterion by up to ten dB. The worst-case noise contour location, assuming a soft site propagation factor and no shielding from intervening homes, walls or topography is depicted in *Figure 4*. The noise level at Lots 9 and 10 would result in a significant noise impact if not mitigated. The first floor noise level at Lots 1-7, and 11-15 would be 60 dB CNEL or less. The noise level would be 60 dB CNEL or less at nearly the entire area of Lot 8. Lot 8 would have more than the minimum required noise sensitive area exposed to a noise level of 60 dB CNEL or less. Thus, with the exception of Lots 9 and 10, the future noise levels would at the site would comply with the County's 60 dB CNEL exterior noise criterion.

The noise level at the second floor, assuming a hard site propagation factor and no shielding from intervening homes, walls or topography is shown in *Figure 5*. As shown, the future 60 dB CNEL noise contour would be located approximately 275 feet from the center line of Hillsdale Road.

3.2 Interior Noise Impact

The County requires that interior noise levels not exceed a CNEL of 45 dB. Typically, with the windows open, building shells provide approximately 15 dB of noise reduction. Therefore, rooms exposed to an exterior CNEL greater than 60 dB could result in an interior CNEL greater than 45 dB. Lots 9 and 10 could exceed an interior noise level greater than 45 dB CNEL. Also, Lots 7, 8, 11 and 12 could exceed an interior noise level greater than 45 dB CNEL if two story homes are constructed on these lots.

4.0 MITIGATION

4.1 Exterior Traffic Noise Mitigation

Lots 9 and 10 would require six to seven-foot high noise barriers (as measured from the pad elevation) constructed along the top of the slope as shown in *Figure 6*. The noise barriers would attenuate the exterior CNEL to 60 dB or less at the first floor level of the lots. With the noise mitigation, nearly the entire area of Lots 9 and 10 would be 60 dB CNEL or less. Thus, the mitigated exterior noise level at the outdoor living area would exceed 10% of the net lot area as shown in *Figure 6*.

The materials used in the construction of the noise barrier are required to have a minimum surface density of 3.5 pounds per square foot. They may consist of masonry material, acrylic glass, tempered glass or a combination of these materials. The noise barrier must be designed so there are no openings or cracks.

4.2 Interior Traffic Noise Mitigation

To comply with the County's interior noise standard, an interior noise analysis will be required for Lots 9 and 10. Also, an interior noise analysis will be required for Lots, 7, 8, 11 and 12 if two story homes are constructed and located within the 60 dB CNEL noise contour depicted in previously depicted in *Figure 5*. The interior acoustical analysis will be required prior to the issuance of building permits to ensure that the interior CNEL would not exceed 60 dB. The homes on these lots could require air-conditioning or mechanical ventilation, and sound-rated windows.

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This concludes our noise assessment. If you have any questions, please call me.

Sincerely,

DUDEK



Mike Komula

Acoustician

MK/lb

Att: *Figures 1-6*
Attachment 1 and 2

REFERENCES

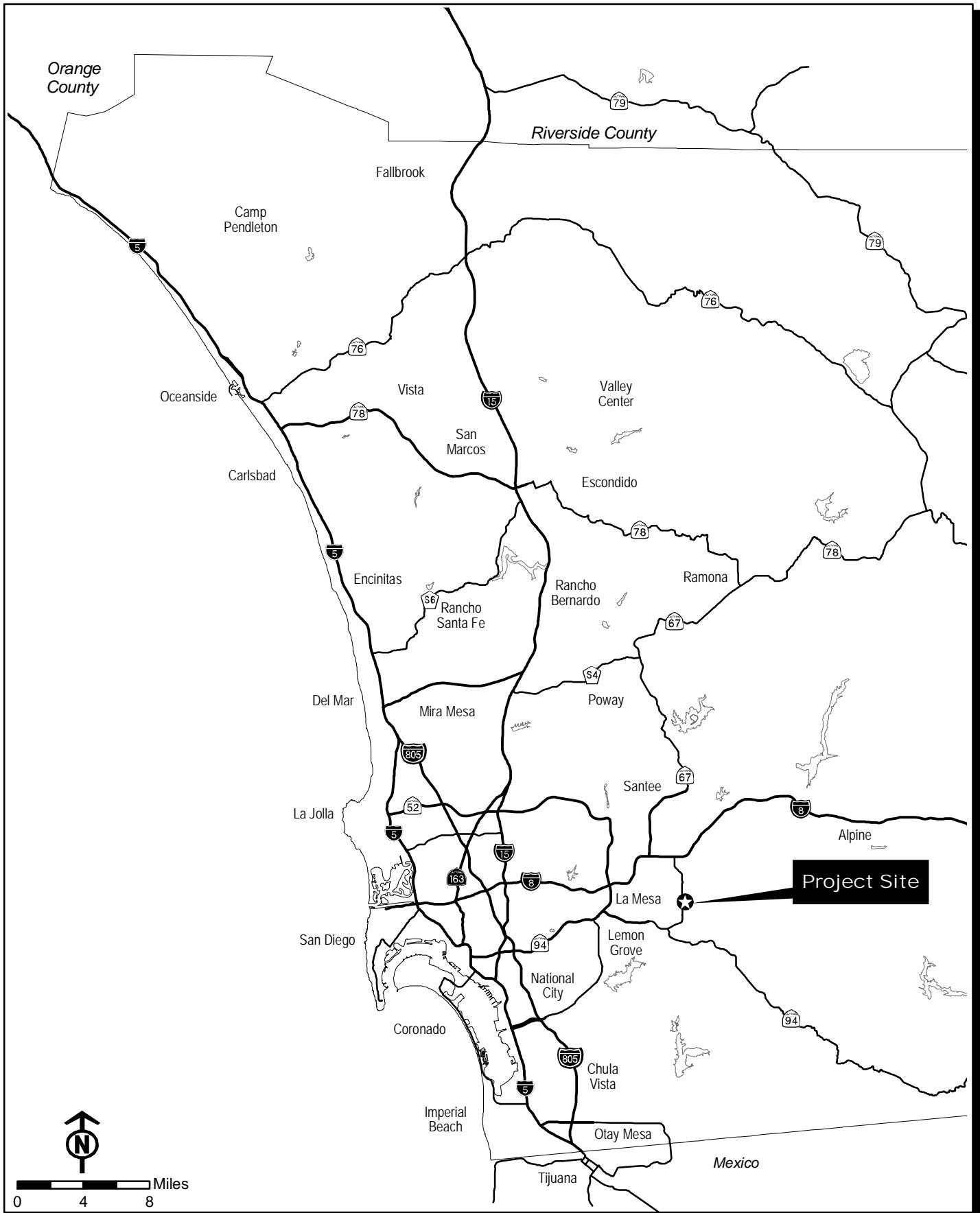
California Department of Transportation (Caltrans), June 1983. *User's Instructions for SOUND32 (FHWA/CA-83/06)*.

California Department of Transportation (Caltrans), 1987. *California Vehicle Noise Emission Levels, (FHWA/CA/TL-87/03)*.

County of San Diego, September, 2006. *San Diego County General Plan Noise Element*.

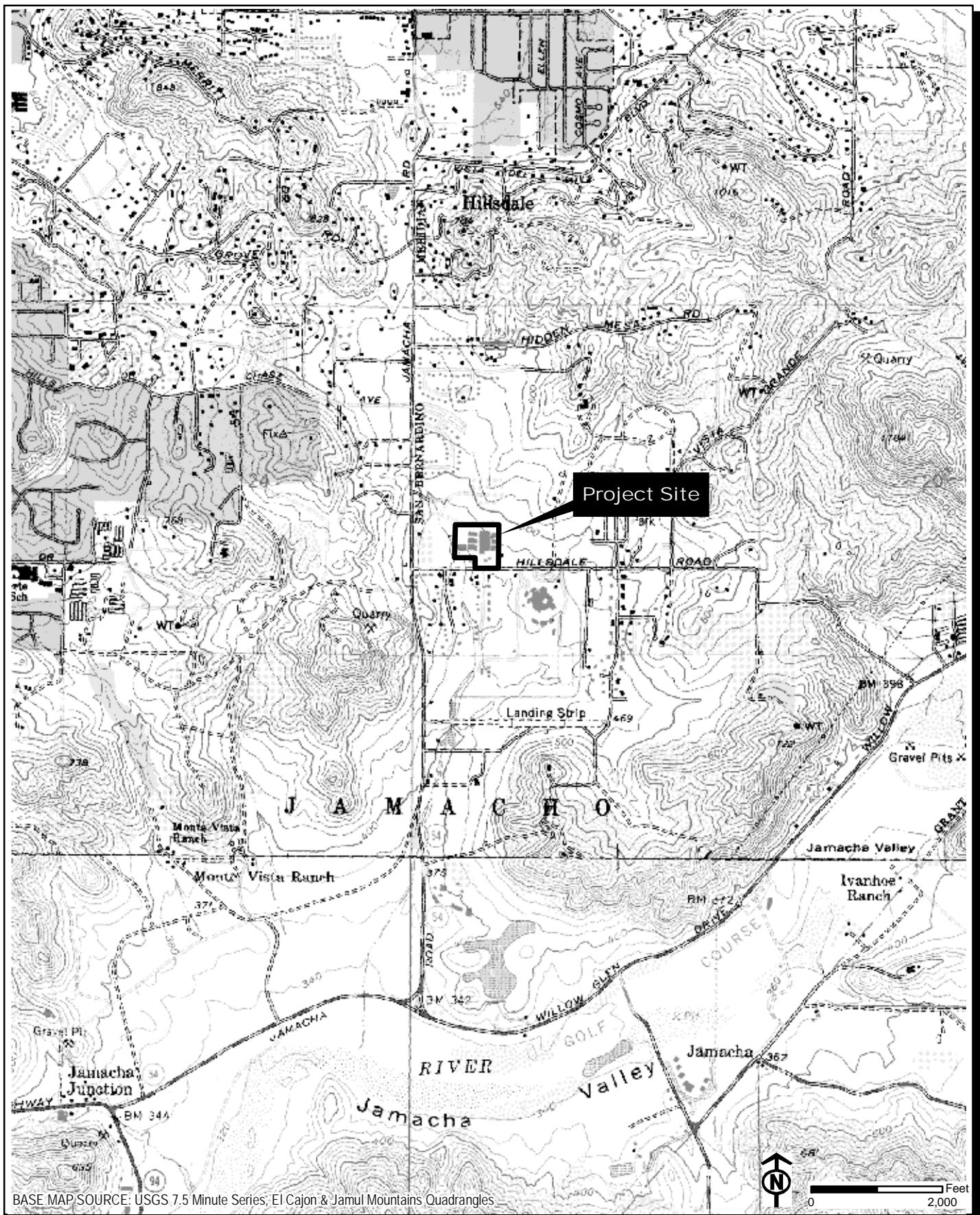
San Diego Association of Governments (SANDAG), November 16, 2005. *Regional Economic Development Information Existing Traffic Volumes*.

San Diego Association of Governments (SANDAG), January 2006. *Transportation Forecast Information Center 2030 Traffic Volume Forecast*.



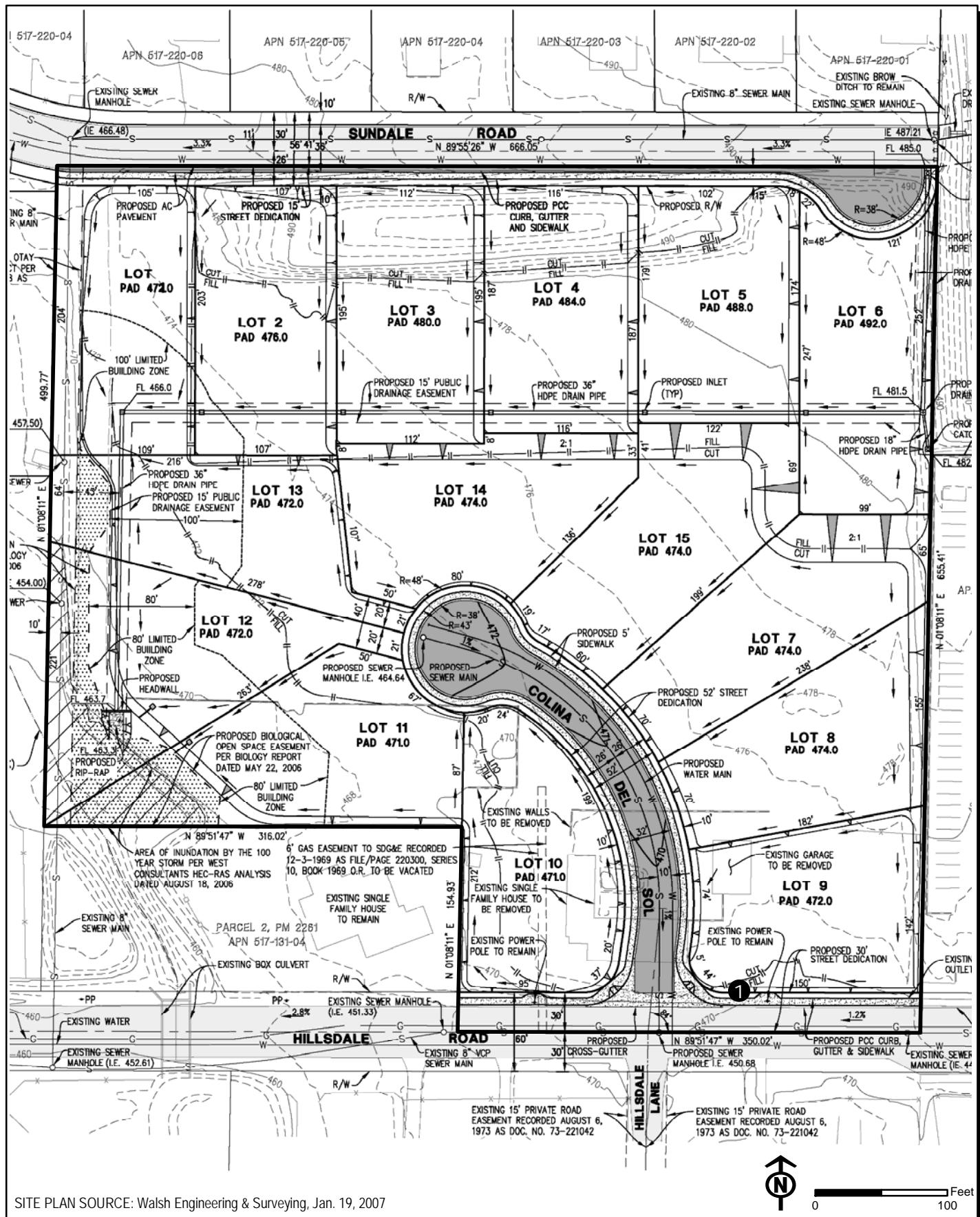
Sundale Subdivision - Environmental Noise Assessment
Regional Map

FIGURE
1



Sundale Subdivision - Environmental Noise Assessment
Vicinity Map

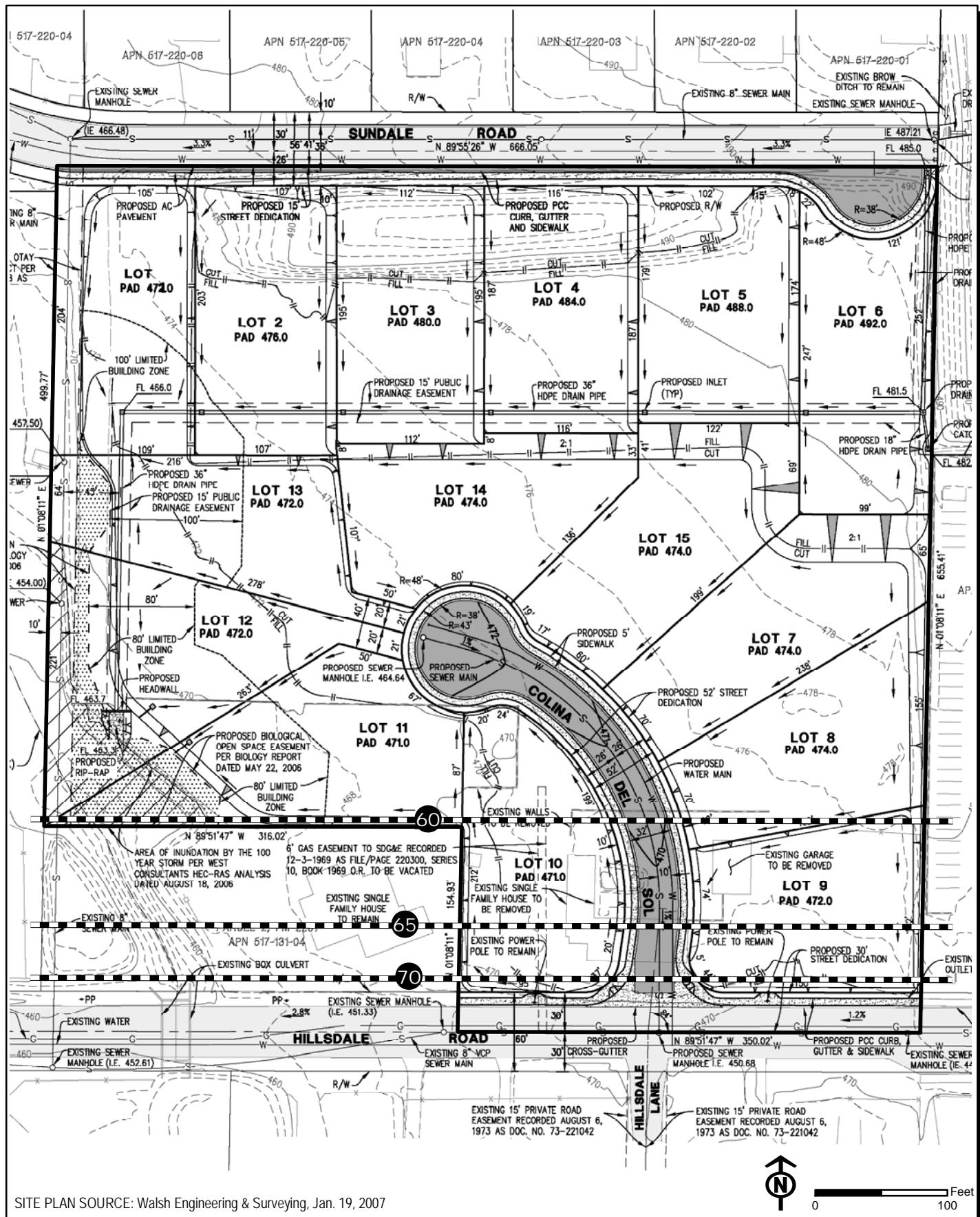
FIGURE
2



Sundale Subdivision - Environmental Noise Assessment

Noise Measurement Location

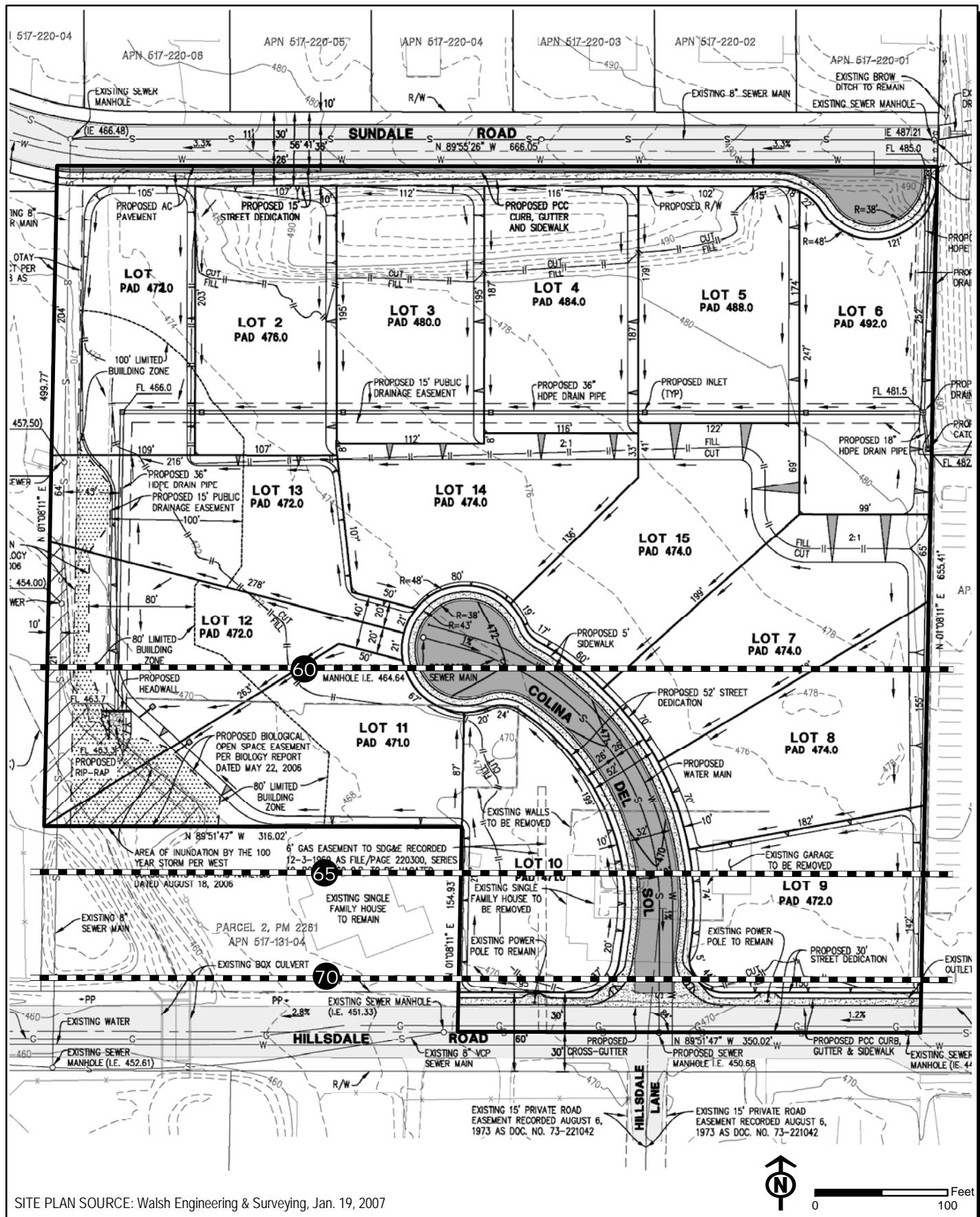
**FIGURE
3**



Sundale Subdivision - Environmental Noise Assessment

Future CNEL Noise Contours (First Floor)

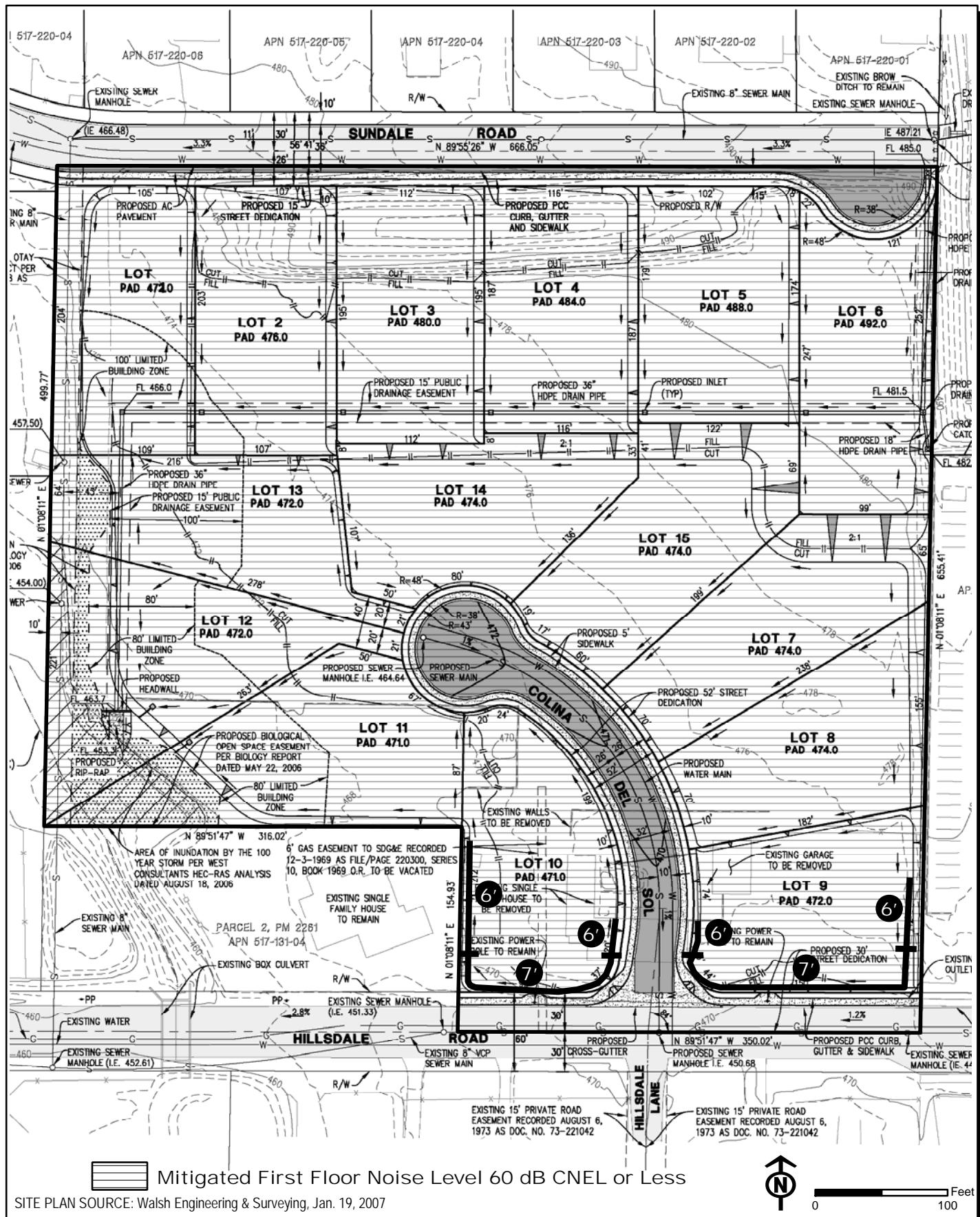
FIGURE 4



Sundale Subdivision - Environmental Noise Assessment

Future CNEL Noise Contours (Second Floor)

FIGURE 5



Sundale Subdivision - Environmental Noise Assessment

Noise Barrier Heights and Locations

FIGURE 6

ATTACHMENT 1

Definitions

ATTACHMENT 1

DEFINITIONS

<u>Term</u>	<u>Definition</u>
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
A-Weighted Sound Level, Dba	The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Community Equivalent) Sound Level (CNEL)	CNEL is the A-weighted equivalent continuous sound exposure (CNEL) level for a 24-hour period with a 10 dB adjustment added to sound levels occurring during the nighttime hours (10 p.m. to 7 a.m.) and 5 dB added to the sound during the evening hours (7 p.m. to 10 p.m.).
Decibel, (dB)	A unit for measuring sound pressure level and is equal to 10 times the logarithm to the base 10 of the ratio of the measured sound pressure squared to a reference pressure, which is 20 micropascals.
Time-Average Sound Level	The sound level corresponding to a steady state level containing the same total energy as a time varying signal over a given sample period. TAV is designed to average all of the loud and quiet sound levels occurring over a time period.

ATTACHMENT 2
Noise Modeling Input and
Future CNEL

Sundale.mit

Sundale Mitigated (Sundale.mit)

T-Hillsdale Road, 1

582 , 45 , 12 , 45 , 6 , 45

T-Hillsdale Road, 2

582 , 45 , 12 , 45 , 6 , 45

L-Eastbound, 1

N,6353673.,1857733,459,1

N,6353940.,1857733,460,2

N,6354116.,1857732,462,3

N,6354193.,1857732,464,4

N,6354256.,1857732,466,5

N,6354331.,1857732,468,6

N,6354435.,1857732,470,7

N,6354608.,1857731,472,8

N,6354800.,1857730,473,9

L-Westbound, 2

N,6353673.,1857745,459,1

N,6353940.,1857745,460,2

N,6354116.,1857744,462,3

N,6354193.,1857744,464,4

N,6354256.,1857744,466,5

N,6354331.,1857744,468,6

N,6354435.,1857744,470,7

N,6354608.,1857743,472,8

N,6354800.,1857742,473,9

B-Wall Lot 9, 1 , 2 , 0 ,0

6354437,1857821,472,479,B1

6354442,1857779,472,479,B2

6354456,1857773,472,479,B3

6354598,1857771,472,479,B4

6354603,1857849,472,479,B5

6354604,1857896,472,472,B6

B-Wall Lot 10, 2 , 2 , 0 ,0

6354380,1857823,471,478,B10

6354369,1857778,471,478,B11

6354341,1857768,471,478,B12

6354274,1857772,471,478,B13

6354267,1857781,471,478,B14

6354269,1857890,471,477,B15

B-Pad Lot 11, 3 , 2 , 0 ,0

6354269,1857890,471,471,B15

6354258,1857901,471,471,B16

6354136,1857902,471,471,B17

6354110,1857947,471,471,B18

B-Existing Wall, 4 , 2 , 0 ,0

6354615,1857827,478,484,E1

6354616,1857890,480,486,E2

6354617,1857983,482,488,E3

6354621,1858144,484,490,E4

6354621,1858173,486,492,E5

B-Existing House, 5 , 2 , 0 ,0

6354242.,1857813,468,478,H1

6354141.,1857838,468,478,H2

R, 1 , 67 ,500

6354436,1857978,479,L7

R, 2 , 67 ,500

6354513,1857900,479,L8

R, 3 , 67 ,500

6354520,1857787,477.,L9

R, 4 , 67 ,500

6354569.81,1857801.6,477,L9b

R, 5 , 67 ,500

6354560.37,1857811.68,477,L9c

Sundale.mit

R, 6 , 67 ,500
6354339,1857779,476,L10
R, 7 , 67 ,500
6354338.07,1857788.65,476,L10b
R, 8 , 67 ,500
6354336.77,1857798.75,476,L10c
R, 9 , 67 ,500
6354205,1857911,476.,L11
R, 10 , 67 ,500
6354079,1858001,477.,L12
R, 11 , 67 ,500
6354264,1858092,479.,L14
R, 12 , 67 ,500
6354384,1858033,479.,L15
R, 13 , 67 ,500
6354485,1857768,475.,M1
D, 4.5
ALL,ALL
C,C

SOUND32
SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

TITLE:
Sundale Mitigated (sundale.mit)

1

BARRIER DATA

BAR ELE	0	1	2	3	4	5	6	7	BAR ID	LENGTH	TYPE
1	-	7.*							B1	42.3	
2	-	7.*							B2	15.2	
3	-	7.*							B3	142.0	
4	-	7.*							B4	78.2	
5	-	4.*							B5	47.5	
6	-	7.*							B10	46.3	
7	-	7.*							B11	29.7	
8	-	7.*							B12	67.1	
9	-	7.*							B13	11.4	
10	-	7.*							B14	109.0	
11	-	0.*							B15	15.6	
12	-	0.*							B16	122.0	
13	-	0.*							B17	52.0	
14	-	6.*							E1	63.0	
15	-	6.*							E2	93.0	
16	-	6.*							E3	161.1	
17	-	6.*							E4	29.1	
18	-	10.*							H1	104.0	

1

REC REC ID DNL PEOPLE LEQ(CAL)

1	L7	67.	500.	53.4
2	L8	67.	500.	54.8
3	L9	67.	500.	60.3
4	L9b	67.	500.	59.3
5	L9c	67.	500.	58.5
6	L10	67.	500.	60.0
7	L10b	67.	500.	59.3
8	L10c	67.	500.	58.5
9	L11	67.	500.	55.6
10	L12	67.	500.	55.4
11	L14	67.	500.	51.5
12	L15	67.	500.	52.1
13	M1	67.	500.	71.3

BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION

7. 7. 7. 7. 4. 7. 7. 7. 0. 0. 0. 6. 6. 6. 6. 10.